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REPORTS
FOX, B.L.

Livestock-fishery study: range work accomplishment report

Bruce L. Fox

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February 6, 1980

SUBJECT: Intermountain Station, Livestock-Fishery Studies

TO: Hallie Cox
Director of Range Management
Region Four

Enclosed is a Range Work Accomplishment report prepared by Bruce Fox and submitted to Bill Platts of the Intermountain Forest and Range Experiment Station. This report documents measurements and observations made by Bruce Fox and Abb Taylor, in cooperation with the Intermountain Station, in assessment of the range element of their Livestock-Fishery Study.

G. Val Simpson

G. VAL SIMPSON
District Forest Ranger

Enclosure

RM-FILE

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Cascade RD

REPLY TO: 2250 Cooperation

February 4, 1980

SUBJECT: Livestock-Fishery Studies

TO: William S. Platts, PH.D.
Research Fishery Biologist
Intermountain Forest and Range Research Station

Enclosed is a Livestock-Fishery Study Range Work Accomplishment report, prepared by Bruce Fox. This report was prepared to document measurements and observations gathered to date for our District records, and to provide you with an overview of information we have collected. The information provided is a brief summary. More detailed information is available from our District records.

G. Val Simpson

G. VAL SIMPSON
District Forest Ranger

Enclosure

LIVESTOCK-FISHERY STUDY
RANGE WORK ACCOMPLISHMENT REPORT

I. INTRODUCTION

Four enclosures, located with the Stolle Meadows ares of the South Fork of the Salmon River, received their first treatment (were grazed by cattle) during the 1979 grazing season as a part of Livestock-Fishery Interaction Study. This study is being conducted by the Intermountain Forest and Range Expirement Station, and is intended to bridge existing information gaps concerning effects of livestock grazing on fish and acquatic habitats. Another study site, located within the Johnson Creek drainage, served as an exclosure and received no grazing.

In cooperation with the Intermountain Forest and Range Experiment Station, Range Conservationist Bruce Fox Cascade Ranger District and Abb Taylor, Range Conservationist, Supervisor's Office, have provided the following support for studies conducted on the Cascade Ranger District:

A. Provided written critiques of the publication "Livestock Grazing Effects on Fish and Riparian Environment (A Compendium)".

B. Provided technical information concerning:

1. Operation of grazing systems

2. Construction of range fences

C. Established permanent site analysis transects within each enclosure to measure:

1. Forage production

2. Site condition

3. Provide base line data for measuring range trend

4. Identify plant species and vegetative composition

5. Determine tentative carrying capacity

D. Conducted production studies to measure forage production and that variability of production in successive years during the study.

E. Established utilization cages to monitor utilization, determining when cattle should be removed.

F. Observed livestock reactions to confinement within the enclosures.

This report will briefly summarize results of range measurements and observations taken during the first treatment year of the studies located on the Cascade Ranger District.

The four enclosures, located in the upper South Fork of the Salmon River, were all designed to simulate use under a three pasture rest-rotation system of grazing. During 1979, they were all grazed from a time of range readiness to a time in which a predetermined, prescribed degree of utilization was reached. The prescribed degree of utilization varied with each enclosure. The attempt was made to adjust the rate of stocking within each enclosure so that the prescribed utilization would coincide approximately with see ripe.

II. STUDY AREAS

Discussion of study areas relates only to the areas within the enclosures which were grazed by livestock, with the exception of the Tyndall Meadows exclosure.

All enclosures were grazed from July 6 to August 22, 1979. Cattle were removed at the same time regardless of varying degrees of utilization, to accomodate the livestock cooperator.

In all cases vegetative production was reduced in 1979 as compared to 1978, due to spring growing conditions. Weather data is not available at this time but will be incorporated into the narrative interpretation of the production studies when it becomes available.

A. Upper Stolle Enclosure

This enclosure was located farthest upstream than other enclosures. It is approximately seven acres in size. The enclosure is composed of a combination of wet meadow, dry lodgepole flat, and predominantly wet spruce-lodgepole, east facing slope.

It was stocked with six pair (cow/calf) of cattle. The prescribed degree of utilization to be reached was 80 percent.

The permanent site analysis transect for this enclosure was established the year prior to grazing by livestock, on July 18, 1978. Production was measured at 1,438 lb.s/acre, dry weight, of d & I plants. This

production was composed of 45 percent grasses and grasslike plants and 55 percent forbs. The site was assessed in a low-good condition. Production measurements taken July 2, 1979, resulted in 605 lb.s/acre, dry weight, of desirable and intermediate plants. This production was composed of 35 percent grasses and 65 percent forbs.

Utilization was measured at 85.3 percent in the flat areas within the enclosure and on both sides of the stream. The east facing slope within the enclosure revealed a more variable degree of utilization ranging from 35-70 percent. This pattern of use related to ease of accessibility by livestock.

Salt was located on the east side of the stream in the southeast corner of the enclosure. Cattle consumed approximately two-thirds of a 50 pound block during this period.

This group of cattle reacted favorably to their confinement within a relatively small area. Stream banks in this enclosure were low to the stream and cattle crossed the stream frequently. Stream crossing was possible at almost any location and crossing did occur throughout the length of the stream, although one main crossing site was utilized more heavily. Cattle were not overly wild but moved off a distance when encountering human activity. Cattle generally occupied the west side of the stream, where tree cover was present, during the heat of the day and preferred grazing the more open areas in morning and evening.

Vegetation along streambanks was utilized to a larger degree in this enclosure than any other, and received more physical impact to streambanks than the other enclosures.

B. Stolle-Guard Enclosure

This enclosure, located directly in Stolle Meadows, is approximately 10 acres in size. Five acres is composed of a dry meadow on the east side of the stream. No shade cover is provided on this side of the stream. The west side of the stream within the enclosure is a mixture of conifer, brush, wet and dry meadow vegetation types. The predominant vegetation type is brush composed of willows.

The Stolle-Guard enclosure was stocked with ten pair (cow/calf) of cattle. The prescribed utilization to be allowed was 70 percent.

A permanent site analysis transect was established with this enclosure on July 6, 1978. Forage production was measured at 1,040 pounds per acre, dry weight, of desirable and intermediate vegetation.

Production measurements taken on June 28, 1979, revealed 774 pounds per acre, dry weight, of desirable and intermediate vegetation. The site was assessed as in a high-fair condition. Vegetation was composed of 45 percent grasses and 55 percent forbs.

Utilization at the site of the plot, located in the dry meadow on the east side of the stream, was measured at 80.5 percent. Utilization on the west side of the stream was variable, due to variation in vegetative types, and ranged from 50-75 percent.

Salt was placed on the west side of the stream, in an area shaded by tree cover.

This group of cattle also reacted favorably to their confinement within the enclosure. Time spent by animals on the open, east side of the stream usually occurred in morning and evenings, while hotter periods of the day were spent in cover on the west side.

One site was primarily used to cross the stream by cattle. This site was the predicted crossing site prior to introduction of cattle into the enclosure and photographs documenting the condition, prior to and after removal of cattle, can be found in the Stolle-Guard Permanent Site Analysis Study folder.

The area of this enclosure has been grazed by Forest Service horses. Banks are undercut in places and sloughage into the stream has occurred. Bank damage by cattle is primarily isolated to the area used as a crossing site. This disturbance is judged as light and localized.

C. Stolle-Cougar Enclosure

This enclosure is approximately 10 acres in size. It is also diverse in vegetational types. The east side of the stream is made up of dry meadow, lodgepole, and a small stringer of willow brush running within a small wet meadow stringer. The west side of the stream is predominantly willow overstory/wet meadow understory, although some timber exists.

The enclosure was stocked with 10 pair of cattle and the prescribed degree of utilization to be reached was 60 percent.

This area has also been grazed by horses in the past. One of the primary watering and crossing sites used by these horses is located within the enclosure.

A permanent site analysis transect was established June 27, 1979 within the dry meadow site on the east side of the stream. This dry meadow area was formerly a part of the Stolle Administrative Pasture. Production was measured at 318 pounds per acre dry weight of intermediate and desireable vegetation. Production was composed of 48 percent grasses and 52 percent forbs. Condition was assessed as fair.

This group of cattle reacted unusually to their new environment in comparison to the other groups of cattle. As mentioned previously, an established stream crossing site existed within this enclosure, and yet this group of cattle refused to cross this stream of their own free will. This resulted in an extensive over-utilization of the dry meadow on the east side of the stream. Utilization was measured at 98.5 percent. Cattle utilized willows which existed on the east side of the stream to a moderate degree, due to lack of available forage. Finally, cattle were forced across the stream to the west side where forage was abundant. Cattle remained on this side of the stream until removed. Utilization on the west side of the stream ranged from 30-50 percent, and was quite variable.

Bank disturbance was limited to the traditional watering area used by horses. Cattle also used this site to water. A gravel layer exists 10-12 inches beneath the soil. This layer is exposed along the stream bank at this site and the bank has sloughed off due to previous livestock use. This site had been predicted as the probable watering and crossing location, and before grazing-after grazing photos exist in the Stolle-Cougar permanent site analysis folder. Bank damage on this site would be evaluated as light and localized.

D. Stolle-Fish Trap Enclosure

This site occupies approximately eight acres. With the exception of a few isolated, dry, lodgepole islands and one toe slope of lodgepole this enclosure is almost entirely composed of wet meadow. This wet meadow is a monoculture of carex and bluejoint reedgrass (Calamagrostis canadensis). A few patches of willow also exist.

Streambanks are high above the water and are undercut. The dense vegetation growing in this moist site provides an armoring which drapes over these undercut banks to the waters edge.

Five pair of cattle were placed in this enclosure and the degree of utilization to be attained was set at 55 percent.

A permanent site analysis transect was established within the enclosure on July 3, 1979. One of the three legs of this transect was established within a dry lodgepole/Idaho fescue cover type and the remaining two legs were established within the moist area, more representative of the enclosure.

Production of the dry site was measured at 641 pounds per acre, dry weight, of desirable and intermediate forage. Production was composed of 43 percent grasses and 57 percent forbs. Production in the wet site was 1,489 pounds per acre, dry weight, of intermediate and desirable forage. This production was composed of 79 percent grasses and 21 percent forbs. The dry site was evaluated to be in good condition and the moist area was in excellent condition.

This group of cattle was wilder than any of the other groups. The majority of this enclosure was on the west side of the stream, which had to be crossed to gain access to the west side. When these cattle were unloaded they immediately crossed to the west side and did not cross back until removed from the enclosure. These animals would retreat to lodgepole cover at the back, west and north side of the enclosure whenever humans approached. Henceforth, the small area on the east side of the stream received zero utilization. The dry site on the west side of the stream received 74 percent utilization. The moist area received an average 40 percent utilization.

There was only one area that appeared suitable as use for watering by cattle due to the prevalence of high, overhung banks. This site was located on the west side of the stream at the southern water gap. Photographs of this site were taken prior to and after treatment by cattle grazing, and can be seen in the Stolle-Fish Trap permanent site analysis folder. Physical impacts to streambanks within this enclosure are evaluated as negligible.

E. Tyndall Meadow Exclosure

This study area was established on Johnson Creek within the Sand Creek Cattle Allotment. It was established to protect from grazing the same linear feet of stream as is being grazed within the Stolle Meadow enclosures. The purpose of the exclosure is to compare grazing on upstream and downstream areas to the ungrazed area within the enclosure, the rehabilitative potential of the ungrazed area, and the effects of upstream grazing on the ungrazed area of stream.

The Sand Creek allotment operates under a three pasture rest-rotation system of grazing. The unit this exclosure is within was grazed from range readiness to seed ripe in 1978, and was scheduled to be grazed after seed ripe in 1979. However, due to good forage production and the pattern of use in the first grazed pasture of 1979, a management decision was made not to remove cattle from the first grazed pasture to the seed ripe pasture. Therefore, the exclosure, and upstream and downstream controls were not treated by grazing as scheduled during 1979.

This has presented a problem in information gathering by the research station, which is attempting to monitor effects of a controlled, three pasture rest-rotation grazing system. It must be realized, however, that a degree of flexibility is provided for in any grazing system. In any given year or number of years, adjustments can and should be made in consideration of yearly climatic and vegetative production fluctuations, as long as the needs of the plants are met. This may involve grazing of all units in a particularly bad growing year. Of course, non-adherance to the grazing system schedule cannot be continued over a period of years without loss of plant vigor, reproduction, etc.

A permanent site analysis transect exists directly adjacent to the Tyndall Meadows exclosure. This study was re-read August 28, 1979. Production was 583 pounds per acre, dry weight, of desirable and intermediate plants. Production was composed of 30 percent grasses and 70 percent forbs. Site condition was assessed as poor. No utilization occurred on the site during 1979.

with the exception of the moist site at the Stolle-Fish Trap study area, all ~~grazing~~ ~~is~~ utilization would have to be considered as very High.

III. RESULTS

Table 1. Summary of Enclosure Site Measurements, displays a brief and un-detailed summary of measurements gathered during 1978-1979. Detailed inventory information and photo records can be found in the permanent site analysis folder for each enclosure.

Table 1. Summary of Enclosure Site Measurements

STUDY AREAS	PRODUCTION 1/ 1978	PRODUCTION 1/ 1979	SITE 2/ CONDITION	PERCENT UTILIZATION 3/ DESIRED	PERCENT UTILIZATION 3/ ACTUAL
Upper Stolle	1,438	605	Good	80	85.3
Stolle-Guard	1,040	774	Fair	70	80.5
Stolle-Cougar	n/a	318	Fair	60	98.5
Stolle-Fish Trap					
Dry Site	n/a	641	Good	55	74
Moist Site	n/a	1,489	Excellent	55	40
Tyndall Exclosure	n/a	583	Poor	0	0

1/ Production figures are measurements taken at the site where the permanent site analysis transect was established and represent pounds per acre, dry weight, of desirable and intermediate vegetation. Vegetative production varies within all enclosures according to variability in vegetative types.

2/ Site condition was assessed based on information gathered from permanent site analysis transects and is specific to that site.

3/ Actual percent utilization figures were derived from sites where utilization cages were established.

IV. CONCLUSIONS

All inventory information scheduled was completed during 1979. Use of permanent site analysis information is helpful in determining tentative stocking rates, but due to variability of vegetative types within each enclosure, it can at best be a rough estimate. This problem was anticipated, which lead to the alternative of prescribing a level of utilization to be reached and then remove livestock. Problems exist with this alternative, creating a burden to the livestock cooperator by having to remove each group of cattle within each enclosure, when that prescribed degree of utilization is reached. Utilization of the forage was also quite variable, due to mixtures of vegetative types within enclosures, ranging in one enclosure from 35-98 percent. This makes judgement of when the prescribed degree of utilization is reached impossible, unless this degree of use is tied to a key site.

Also, use of the permanent site analysis studies to determine trend of the vegetation is limited, due to the relatively short duration scheduled for this study. The information may provide some indication of immediate, short-term trend, but would require a longer duration of grazing years to get a realistic determination of long term trend.

In general, livestock reacted favorably to their enclosure within a relatively small area. But some behavior was unpredicted and directly influenced the pattern of use upon the vegetation by cattle. This behavior by cattle may vary yearly with new individuals and groups introduced into the enclosures. These variations and untypical behavior could have pronounced influences upon results of the study. This is to say that individuals and groups of cattle may react differently to confinement within these enclosures. Therefore the results of the study may vary through physical bank alteration, use of streamside vegetation, etc., with different groups of animals.

In two of the enclosures, the Stolle-Guard and the Upper Stolle, animals utilized primary stream crossing sites as predicted. This was to a lesser extent in the Upper Stolle site where animals crossed throughout the stream also. In the Stolle-Cougar and Stolle-Fish Trap sites animals crossed the stream only when forced. The Upper Stolle site sustained more bank alteration than any other enclosure, and this bank alteration decreased within each site downstream to the Stolle-Fish Trap site. Utilization was also greater in the

Upper Stolle, as designed, decreasing to the Stolle-Fish Trap. However, it is felt that with the exception of the Stolle-Cougar site, the degree of bank alteration is influenced more strongly by physical bank characteristics. In the case of the Upper Stolle enclosure, which is located in the uppermost reaches of the South Fork, the bank edges protrude maybe no more than 6-12 inches above the waters edge. This permits cattle to cross the stream in many locations with ease and to utilize vegetation growing on the edges of streambanks. In contrast, the Stolle-Fish Trap enclosure, the farthest downriver enclosure, has banks which protrude 3-4 feet in places over the waters edge. Banks are undercut and very unstable. The stream is much wider and deeper, discouraging crossing. This enclosure received negligible bank damage. Therefore, even though the enclosure receiving the heaviest use also received the greatest bank alteration, it is felt that the degree of alteration is related, to a larger degree, to existing physical bank characteristics.

Some of the problems encountered during the first treatment year of this study, such as production and overall degree of utilization measurements within enclosures, cannot be accurately reflected without intensive and vegetative type-specific inventories. Variation in behavior of grazing animals, which in turn influences utilization of the enclosures, is even more difficult to accurately reflect in a controlled experiment of small scale.

These diversities in vegetative communities and livestock behavior are everyday commonalities, on a larger scale, in applying the principles of range management and exercising management decisions. But they do not lend themselves to easy measurement in a small scale, controlled experiment, and require professional judgement in resource management.

Perhaps it is not necessary for the intended purpose of this study to attempt quantification of these variables. But they do have an important influence on the on-site effects which are being measured and should at least be qualified within the context of the final conclusions of this study.

V. RECOMMENDATIONS

The following items should be discussed at a 1980 winter-spring meeting of involved parties.

1. Adjustments in stocking of enclosures based on past observed utilization.

2. Measurement and monitoring of utilization to determine when the prescribed degree of utilization has been reached. Based on veg. type

3. Management of livstock distribution within enclosures.

4. Review cooperative agreement.

5. Line of communication between Cascade Ranger District and Intermountain Station during treatment periods.

6. Discuss 1980 grazing schedule and coordination with livestock coordinator.

7. Transfer of information.

Bruce L. Fox

Prepared by: Bruce L. Fox